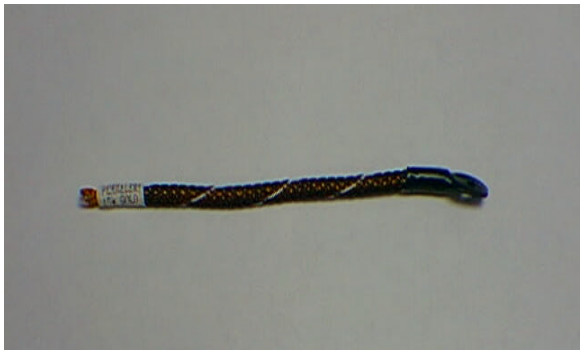
Continuous Length Leak Detector

The Challenge

Hanford Tank Farm facilities include miles of underground waste transfer piping for the transfer of radioactive waste. Transfer lines are typically a pipe-within-a-pipe design to provide a secondary safety and environmental protection barrier. Tank waste transfers will be increasing as waste is removed from older single-shell tanks and other waste is staged for upcoming processing and disposal. Underground transfer lines often do not have leak detection capabilities or the aging leak detection systems are subject to rainwater intrusion and component failure resulting in false alarms. A dependable reliable system is needed to ensure prompt leak detection capabilities.



A small length of the AGW-Gold cable used for continuous encasement leak detection.

Current Approach

The Hanford Site has traditionally used leak detectors at low points within the encasement system. The existing encasement leak detection is located where the transfer line enters a pit or diversion box. The encasement drain is left open to allow any accumulation of waste or water in the encasement to drain back to the low points in the diversion box or pit. The pit or diversion box leak detectors sense if there is a transfer line leak originating somewhere within the encasement.

The location of leaks cannot be pinpointed with the baseline leak detection system without extensive investigation, and sometimes they cannot be found. The existing system requires significant maintenance and false alarms from rainwater intrusion or component failures impact the reliability of this important system. A significant amount of time is required for operations, maintenance and engineering to keep these leak detection systems functional.

New Technology

The Replacement Cross-Site Transfer System (RCSTS) continuous line leak detectors, using proven off-the-shelf technology, has a split jacket coaxial cable installed inside the transfer line encasement pipe. A microprocessor-based control panel sends a pulsed signal through the coaxial cable and monitors the return signal at a periodic frequency dependent

Benefits and Features

- Reliable and repeatable detection performance
- Off-the-shelf commercially available
- Low maintenance
- Intrinsically safe operation
- Leak location capability

upon the cable's length. If waste or rainwater comes in contact with the split jacket coaxial cable the material provides an electrical pathway. The signal issued by the control panel would then have a shorter return time. This determines the leak's location (a simple comparison function with the known linear leak detector cable length). The sensing of liquid requires less than one minute and the detector's function is predictable and repeatable.

The new Diversion Box (Building 6241-A), Vent Station (Building 6241-V) and the control panel located near B-Plant are the three locations where the control panels are installed. These panels provide alarm signals through the RCSTS Operations Control System. These units provide a shutdown of the cross-site transfer pump upon detection of a leak.

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